

CLAIMS

I claim:

1 1. An apparatus comprising:
2 a handle;
3 a flexible body portion coupled to the handle, the
4 flexible body portion having dimensions suitable for
5 insertion into and navigation through a body, the flexible
6 body portion defining a lumen therethrough and having a
7 distal portion and a proximal portion, wherein the proximal
8 portion comprises
9 a flexible element disposed around the lumen, and
10 a braid disposed over the flexible element;
11 a first plastic coating impregnated into the proximal
12 portion of the flexible body portion;
13 a second plastic coating impregnated into the distal
14 portion of the flexible body portion;
15 an anchor element disposed in the distal portion of the
16 flexible body portion; and
17 a tendon wire having a distal end coupled to the anchor
18 element and a proximal end coupled to the handle such that
19 manipulation of the handle results in deflection of the
20 distal portion of the flexible body portion.

1 2. The apparatus of Claim 1 further comprising:
2 an electrical interface electrically coupled to the tendon
3 wire, wherein the anchor element and the tendon wire each
4 comprise electrically conductive material such that an
5 instrument can receive an electrical signal from the tendon
6 wire through the electrical interface.

1 3. The apparatus of Claim 1, wherein the anchor
2 element comprises:

3 at least one of a ring and an electrode.

1 4. The apparatus of Claim 3, further comprising:
2 a third plastic coating, stiffer than the second
3 plastic coating, disposed on an area just proximal to the
4 anchor element.

1 5. The apparatus of Claim 1, wherein the flexible
2 element is at least one of a coil and a second braid.

1 6. The apparatus of Claim 5, wherein the flexible
2 element is one of a single coil and a multi-filar coil.

1 7. The apparatus of Claim 5, wherein the first braid
2 is wound at an angle of approximately 55 degrees relative to
3 a longitudinal axis of the flexible body portion.

1 8. The apparatus of Claim 1, further comprising:
2 a first piece of elastically deformable material
3 disposed on a first area of the distal portion of the
4 flexible body portion; and
5 a second piece of elastically deformable material
6 disposed on a second area of the distal portion of the
7 flexible body portion, the second area located approximately
8 180 degrees from the first area.

1 9. The apparatus of Claim 8, further comprising:
2 a coil of elastically deformable material coupled to
3 each of the first and second pieces of elastically
4 deformable material.

1 10. The apparatus of Claim 1, further comprising:
2 a second lumen defined by the flexible body portion;
3 and
4 an elongate stabilizing member having a distal end, the
5 stabilizing member to be disposed within the second lumen

6 such that the distal end of the stabilizing member protrudes
7 therefrom such that the distal end of the stabilizing member
8 may be placed in a position within the body to act as a
9 reference point for the flexible body portion.

1 11. The apparatus of Claim 1, further comprising:
2 a location sensor disposed on the distal portion of the
3 flexible body portion, the location sensor to indicate a
4 position of the distal portion of the flexible body portion
5 within the body by at least one of an electromagnetic
6 mapping system, a radio frequency mapping system, and an
7 ultrasonic mapping system.

1 12. The apparatus of Claim 1, further comprising:
2 an accelerometer disposed on the distal portion of the
3 flexible body portion, the accelerometer to obtain
4 information regarding cardiac tissue motion.

1 13. A substance delivery system comprising:
2 a guide catheter comprising
3 a handle;
4 a flexible body portion coupled to the handle, the
5 flexible body portion having dimensions suitable for
6 insertion into and navigation through a body, the flexible
7 body portion defining a lumen therethrough and having a
8 distal portion and a proximal portion, wherein the proximal
9 portion comprises
10 a flexible element disposed around the
11 lumen, and
12 a braid disposed over the flexible element;
13 a first plastic coating impregnated into the
14 proximal portion of the flexible body portion;
15 a second plastic coating impregnated into the
16 distal portion of the flexible body portion;

17 an anchor element disposed in the distal portion
18 of the flexible body portion; and
19 a tendon wire having a distal end coupled to the
20 anchor element and a proximal end coupled to the handle such
21 that manipulation of the handle results in deflection of the
22 distal portion of the flexible body portion; and
23 a needle catheter to be disposed within the lumen of
24 the guide catheter such that a distal end of the needle
25 catheter can protrude from an opening in the distal end of
26 the guide catheter, the needle catheter comprising
27 a duplex spring impregnated with a third plastic
28 coating,
29 a braided shaft disposed over the duplex spring,
30 a needle coupled to an inner diameter of the
31 duplex spring,
32 an electrode coupled to the distal end of the
33 needle catheter, the electrode having an opening through
34 which the needle is movable between a retracted position and
35 a deployed position,
36 an electrical insulator disposed between the
37 needle and the electrode, and
38 a needle control assembly comprising
39 an elastically deformable element coupled to
40 at least one of the duplex spring and the braided shaft of
41 the needle catheter, and
42 a release mechanism which releasably engages
43 the elastically deformable element when the elastically
44 deformable element is in a position which corresponds to the
45 needle being in the retracted position.

1 14. The substance delivery system of Claim 13 further
2 comprising:

3 an electrical interface electrically coupled to the
4 tendon wire, wherein the anchor element and the tendon wire
5 each comprise electrically conductive material such that an
6 instrument can receive an electrical signal from the tendon
7 wire through the electrical interface.

1 15. The substance delivery system of Claim 13, wherein
2 the anchor element comprises
3 at least one of a ring and an electrode.

1 16. The substance delivery system of Claim 15, further
2 comprising:
3 a fourth plastic coating, stiffer than the second
4 plastic coating, disposed on an area just proximal to the
5 anchor element.

1 17. The substance delivery system of Claim 13, wherein
2 the flexible element is at least one of a coil and a second
3 braid.

1 18. The substance delivery system of Claim 17, wherein
2 the flexible element is one of a single coil and a multi-
3 filar coil.

1 19. The substance delivery system of Claim 17, wherein
2 the first braid is wound at an angle of approximately 55
3 degrees relative to a longitudinal axis of the guide
4 catheter.

1 20. The substance delivery system of Claim 13, further
2 comprising:
3 a first piece of elastically deformable material
4 disposed on a first area of the distal portion of the
5 flexible body portion; and

6 a second piece of elastically deformable material
7 disposed on a second area of the distal portion of the
8 flexible body portion, the second area located approximately
9 180 degrees from the first area.

1 21. The substance delivery system of Claim 20, further
2 comprising:

3 a coil of elastically deformable material coupled to
4 each of the first and second pieces of elastically
5 deformable material.

1 22. The substance delivery system of Claim 13, further
2 comprising:

3 a second lumen defined by the flexible body portion;
4 and

5 an elongate stabilizing member having a distal end, the
6 stabilizing member to be disposed within the second lumen
7 such that the distal end of the stabilizing member protrudes
8 therefrom such that the distal end of the stabilizing member
9 may be placed in a position within the body to act as a
10 reference point for the flexible body portion.

1 23. The substance delivery system of Claim 13, further
2 comprising:

3 a location sensor disposed on the distal portion of the
4 flexible body portion, the location sensor to indicate a
5 position of the distal portion of the flexible body portion
6 within the body by at least one of an electromagnetic
7 mapping system, a radio frequency mapping system, and an
8 ultrasonic mapping system.

1 24. The substance delivery system of Claim 13, further
2 comprising:

3 an accelerometer disposed on at least one of the distal
4 portion of the flexible body portion and a distal portion of
5 the needle catheter, the accelerometer to obtain information
6 regarding cardiac tissue motion.

1 25. The substance delivery system of Claim 13, wherein
2 the elastically deformable element comprises:

3 a spring.

1 26. The substance delivery system of Claim 25, wherein
2 the release mechanism comprises:

3 a housing having the spring disposed within the
4 housing;

5 a stop disposed within the housing, distal to the
6 spring, and coupled to at least one of the duplex spring and
7 the braided shaft of the needle catheter;

8 a first latch pivotally coupled to the housing and
9 having a movable portion biased towards the housing, the
10 first latch having an angled portion and a flat portion, the
11 flat portion to engage the stop when the needle is in the
12 retracted position; and

13 a second latch pivotally coupled to the housing and
14 having a movable portion biased towards the housing, the
15 second latch to releasably engage the first latch when the
16 flat portion of the first latch is in contact with the stop
17 in order to prevent the first latch from releasing the stop.

1 27. The substance delivery system of Claim 13, further
2 comprising:

3 a reference electrode coupled to at least one of the
4 distal portion of the guide catheter, a distal portion of
5 the needle catheter, and an outer surface of the body

1 28. A method comprising:

2 inserting a substance delivery system into a body, the
3 substance delivery system comprising a guide catheter and a
4 needle catheter, the needle catheter having a needle movable
5 between a retracted position and a deployed position, a
6 needle shaft assembly, an elastically deformable element
7 coupled to a portion of the needle shaft assembly, and a
8 release mechanism that releasably engages the elastically
9 deformable element when the elastically deformable element
10 is in a position which corresponds to the needle being in
11 the retracted position;

12 moving the substance delivery system to a desired
13 position within the body;

14 setting the release mechanism to hold the needle in the
15 retracted position;

16 releasing the release mechanism when the substance
17 delivery system is in a desired position for insertion of
18 the needle into a portion of the body.

1 29. The method of Claim 28, wherein inserting
2 comprises:

3 inserting the guide catheter into the body; and
4 inserting the needle catheter into the guide catheter.

1 30. The method of Claim 28, further comprising:

2 injecting a substance into the body through the needle.